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# **Charles Dickens, Man of Science<sup>1</sup>**

## ***Victorian Literature and Culture***

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Though he didn't write about it until 1872, George Henry Lewes's apparent "shock" at the state of Charles Dickens's Doughty Street bookshelves in 1839 has become a part of Dickens folklore.<sup>2</sup> Two years after his friend's death, Lewes remembered a library which had contained "nothing but three-volume novels and books of travel, all obviously the presentation copies from authors and publishers". This collection had been slightly improved three years later, once Dickens had moved to the fancier Devonshire Terrace, by "a goodly array of standard works, well-bound," which reflected "a more respectable and conventional" - though not especially intellectual - "ambition". For Lewes, Dickens had forever "remained completely outside philosophy, science, and the higher literature". And if "a man's library expresses much of his hidden life," Lewes continued, Dickens was all about the exuberance of the surface (152). Dickens's entertaining, popular fictions lacked both seriousness and "thought" - qualities Lewes considered "strangely absent from his works" (151).

As several critics have noted, by "thought" Lewes had in mind something flavoured by the scientific, as his comment about the "philosophy, science, and the higher literature" made clear. Dickens "never connects his observations into a general

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<sup>1</sup> This essay builds on work produced for the "Charles Dickens, Man of Science" exhibition at the Charles Dickens Museum in Doughty Street, London, which ran from May 24 2018 to November 11 2018, and was jointly curated by me and Frankie Kubicki, with the additional invaluable support of Jaanuja Sriskantha, Louisa Price, and Subhashini Robert William.

<sup>2</sup> George Henry Lewes, "Dickens in Relation to Criticism," 152. All subsequent references to this edition are noted parenthetically in the text.

expression,” Lewes observed (151), and “never seems interested in the general relations of things. Compared with that of Fielding or Thackeray, his was merely an *animal* intelligence, *i.e.* restricted to perceptions”, his characters “pieces of simple mechanism” (146). This critique was routinely levelled at female or working-class participants in science in this period: considered good enough for gathering data, or for recording the evidence of their immediate sensory impressions, such groups were nonetheless urged to leave the work of synthesis and theoretical generalization to educated gentlemen with time, money and education to spare. In his essay on Dickens, Lewes hints at his friend’s intellectual effeminacy as well as his recently-revealed lower-class origins, characterizing him as a writer relying on sensation over thought, surface detail over depth, his characters mere “puppets” (146), or - in a famous analogy drawn straight from Lewes’s own scientific work - dissected frogs, whose nerves displayed evidence of sensation long after their brains had been cut from their bodies (148-49).<sup>3</sup>

But the fact remained, Lewes argued, that even “learned and thoughtful men” had been “almost as much delighted with the works as” their more “ignorant and juvenile readers” (154). And Lewes was right: the comparative anatomist Richard Owen, Charles Darwin, the chemist Jane Marcet, Ada Lovelace, Charles Babbage - these and many other scientific figures enjoyed bouts of addiction to Dickens’s stories.<sup>4</sup> For Lewes, this fact required explanation - and was the basis of the defence he constructed of Dickens’s

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<sup>3</sup> See also Menke, “Fiction as Vivisection”, 627.

<sup>4</sup> For perceptive work on Dickens and Owen, see Dawson, “Dickens, Dinosaurs, and Design”, and on both Owen and Darwin reading Dickens, see Dawson, “By a Comparison of Incidents and Dialogue”. See also Sage, “Dickens and Professor Owen”. See also Levine, *Darwin and the Novelists*, esp. 120-21. On Dickens and Babbage and Lovelace, see Clayton, *Charles Dickens in Cyberspace*, chap. 4 and Kuskey, “Math and the Mechanical Mind”, Sussman and Joseph, “Prefiguring the Posthuman”. Dickens’s holiday in Lausanne in the summer of 1846, which he spent partly with Jane Marcet, is recounted in Forster, *Life of Dickens* (2 vols), i.450, 464, 486.

literary merits: if serious, thoughtful men cared so much for this apparently mindless novelist, surely there was something of value in his writing? As Lewes had it, Dickens's very superficiality had given him "hallucinatory" imaginative powers: he produced prose of "marvellous vividness", "energy" and "force". This was not the literature of the mind, but it was unprecedentedly pleasurable for the body. Such pleasures, Lewes argued - concentrated in particularly powerful form in Dickens's writing - gave serious men a necessary release from the burdens of intellectual life.<sup>5</sup>

This much is well known. But what has been less clearly understood is the way in which Lewes's association of Dickens with "perception", "vividness," "energy," and "force" at the expense of *thought* was a quite deliberate strategy by which Lewes attempted to obscure Dickens's role as one of the most influential communicators of scientific knowledge in the mid-Victorian period. If this seems a striking claim, then that is just a measure of Lewes's success. In this essay, I attempt to reinstate this occluded history. I do so by drawing on James A. Secord's call, in his influential essay "Knowledge in Transit", to see "knowledge-making ...as a form of communicative action", in which "questions of 'what' is being said can be answered only through a simultaneous understanding of 'how,' 'where,' 'when,' and 'for whom'".<sup>6</sup> For Secord, the *communication* of knowledge is a fundamental act of its *constitution*: laboratory experiments or scientific papers or adventures in fieldwork are designed at the outset with particular audiences in mind, and scientific practitioners build in their desired audiences' particular thresholds for determining plausibility, objectivity, and reliable evidence. As such, scientific practice is always already rhetorical, its very structures

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<sup>5</sup> Gowan Dawson, "By a Comparison of Incidents and Dialogue".

<sup>6</sup> Secord, "Knowledge in Transit," 663-64.

conditioned by the demands of the audiences or communities it is designed to persuade. Here I argue that, if we see science in this way, it is possible to see Dickens occupying a more central position in nineteenth-century scientific culture than has yet been acknowledged. Indeed, it was Dickens's extraordinary power as a communicator that prompted Lewes's article in the *Fortnightly Review* in the first place. Or, as he had put it in his famous skirmish with Dickens over spontaneous combustion in 1853, "What you write is read wherever the English language is read", so that a mistake "sent all over the world with your imprimatur ... will ... perpetuate the error in spite of the labours of a thousand philosophers".<sup>7</sup> Lewes perceived in Dickens a communicative reach that threatened to derail both the credibility and the *making* of new scientific knowledge - and in doing so also threatened to derail Lewes's own scientific and literary projects. Lewes's 1872 essay was as much an attempt to carve out his own intellectual territory as to defend Dickens's oeuvre, and ought to be read as part of a longer history of scientific/literary review-writing with which Lewes was intimately engaged.

Having explored the history of scientific reviewing in relation to Lewes's essay on Dickens, in the second half of this essay I take up Secord's argument - that the content of scientific knowledge is produced *contemporaneously* with the production of audiences for that knowledge - in order to bring into relief a new vision of Dickens. I argue that Dickens was a key maker of both scientific audiences *and knowledges* in the mid-Victorian period.<sup>8</sup> Or, to put it another way, I argue - partly through a re-reading of

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<sup>7</sup> See Haight, "Dickens and Lewes on Spontaneous Combustion."

<sup>8</sup> Secord, "Knowledge in Transit," 663. I am also thinking here of Robert Darnton's "communication circuit", the ways in which "books do not merely recount history; they make it" (81), as they move from authors through publishers, printers, booksellers, readers, and back to the author again (in Darnton, "What is the History of Books?"). See also: O'Connor. "Reflections on Popular Science in Britain"; Cooter and Pumfrey, "Separate Spheres and Public Places", and Topham, "Introduction" and his more recent "Rethinking the History of Science Popularization/Popular Science".

Dickens's interests in mesmerism - that he played a deliberate role in creating audiences for science at midcentury, and that in the very act of creating those audiences he also played a critical role in the construction of a variety of kinds of scientific knowledge. If this history has been obscured, it is because the particular communicative modes by which Dickens articulated his scientific ideas eventually lost out to other communicative modes. It is not because Dickens backed the wrong scientific horses or lacked scientific "thought". Recovering Dickens's place in the history of science communication can tell us something new, both about the history of science communication and its relation to literary history, even as it tells us new things about the reach of Dickens's prose.

## **New knowledge**

To begin with, then, it is important to recognize that Lewes's 1872 essay was more an effort of self-fashioning than of critique. In particular, we ought to be immediately suspicious of Lewes's characterization of Dickens's lack of "thought" by means of a sweeping summary of his bookshelves. Indeed, men of science routinely criticized mere "book-learners" as lacking true scientific experience. A lack of books could be read as a token of a truly scientific mind - of a scientific labourer whose ideas were developed in the field or the laboratory, rather than from the dubious comforts of an armchair.<sup>9</sup>

Furthermore, book-learning was exactly the charge that had been made against Lewes himself in one of the century's most "exclusionary" attacks on a scientific work, his 1853

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<sup>9</sup> See Buckland, *Novel Science*, chaps. 1 and 2. See also Porter, "Gentlemen and Geology," 820-21. T.H. Huxley was particularly exercised about armchair theorizing: in a typical statement (of many), he wrote in a lecture "On the Study of Zoology" in 1861 that "mere book learning in physical science is a sham and a delusion - what you teach, unless you wish to be imposters, that you must first know; and real knowledge in science means personal acquaintance with the facts". As cited in Huxley, *Discourses*, 227.

translation of Auguste Comte's *Philosophy of the Sciences*. That attack had been written by T.H. Huxley and published in the *Westminster Review* in 1854, much to George Eliot's consternation as both editor and partner of Lewes.<sup>10</sup> Lewes's translation, updated to include contemporary scientific ideas, offended Huxley not only because it contained factual errors (the "marvellous error" of muddling "sulphuric acid" with "sulphurous acid gas" revealing, he said, "how impossible it is for even so acute a thinker as Mr Lewes to succeed in scientific speculations, without the discipline and knowledge which result from being a worker also").<sup>11</sup> It offended him also because Lewes had recently criticized him in *The Leader*, and because - he said - Lewes was fatally attached to "an hypothesis" (the development hypothesis, to which Huxley himself had not yet been converted in 1854). The book is "exceedingly clever," Huxley had written: "as an exposition, it is clearness and lucidity itself, and every now and then it rises into genuine eloquence".<sup>12</sup> But "eloquence" and "lucidity" were a kind of devil's snare, tempting readers into a superficial sense of the workings of nature, charming with style where only hard scientific labour would do. "Eloquence" was partly an insult, and it helped suggest that Lewes was not qualified to make sound scientific judgements. His hypothetical spirit and lucidity were offered as the hallmarks of his superficiality.

Huxley's review was itself an act of self-fashioning: as Paul White has demonstrated, it was part of Huxley's campaign "to carve out a role for the man of science outside the restricted sphere of specialist journals, societies, and laboratories" (in which Huxley did not yet have secure employment). Like Lewes, he needed to define

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<sup>10</sup> Barton, "Men of Science," 89.

<sup>11</sup> Huxley, "Science," 255.

<sup>12</sup> Huxley, "Science," 255.

the role of the “man of science” in terms that suited his own precarious position within an intellectual culture defined by print.<sup>13</sup> Nonetheless, it struck a chord with Lewes. Shortly after Huxley’s review he embarked on a decades-long “programme of ‘hard work’ and *independent* study” in the field and laboratory, beginning with a tour of the British and Welsh coast studying marine life. This was an attempt to prove his scientific credentials in Huxleyan terms.<sup>14</sup> Nonetheless, Lewes also defended the value of book-learning as part of his expanding repertoire of scientific skills: “studies of Comparative Anatomy,” he wrote, “had for many years prepared me for the study of marine animals; so that I came to the coast prepared, hungry for knowledge, and ready with general ideas to throw light on particular facts”.<sup>15</sup> Book-learning, he concluded in an indirect challenge to Huxley, was not something to be thrown aside by the true man of science, but crucial *preparation* for scientific work in the field.

Not only that, but book-learning was precisely the thing, Lewes argued, that made it possible to be “interested in the general relations of things”, to rise above the “merely ... *animal* intelligence” that empirical observation alone might afford, and with which he would later characterize Dickens. Reading powered the kind of deep “thought” that made theory and speculation possible. It was what had given him the intellectual heft to join the ranks of elite men of science in the first place: literature had *qualified* him to make sense of his work in the field. At the same time, Lewes defended the right of “self-taught researchers, like himself,” to “investigate organisms for themselves”, “locating science in public and domestic rather than specialized spaces” and believing

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<sup>13</sup> White, *Thomas Huxley* (2002), 71.

<sup>14</sup> Barton, “Men of Science,” 95.

<sup>15</sup> Lewes, “Sea-Side Studies”, lxxx, 184-45. As cited in Barton, “Men of Science,” 95.



“readers had the capacity to make scientific discoveries, question facts and evaluate hypotheses”.<sup>16</sup>

But that did not mean that just anybody could make such discoveries or evaluations: Lewes had trained for years to acquire this right. And so he needed to define the terms of his inclusion, to define the right - and wrong - kinds of readers. Dickens’s lion-like presence in the literary marketplace made him the perfect tool with which to make this demarcation. Lewes’s Dickens is a man whose literary power and popularity - his eloquence and lucidity - rest upon his *lack* of scientific reading. Dickens emerges as precisely the kind of man unqualified for science in Huxleyan terms, through which Lewes could demonstrate his agreement with Huxley’s arguments about fieldwork while carving a space for his own more literary intellectual bent. This is how we get Dickens as a writer with a talent for mere “animal perception”, appealing to a mass readership for whom that kind of perception was easy to digest. Effectively, Lewes extricated himself Huxley’s accusations by projecting them onto Dickens.

This makes sense of a passage of the *Fortnightly Review* article in which Lewes compares Dickens with a popular science writer. “Let us suppose,” Lewes begins,

a scientific book to be attracting the attention of Europe by the boldness, suggestiveness, and theoretic plausibility of its hypotheses; this work falls into the hands of a critic sufficiently grounded in the science treated to be aware that its writer, although gifted with great theoretic power and occasional insight into unexplored relations, is nevertheless pitifully ignorant of the elementary facts and principles of the science; the critic noticing the power, and the talent of lucid exposition, is yet perplexed and irritated at ignorance which is inexcusable, and a reckless twisting of known facts into impossible relations, which seems wilful; will he not pass from marvelling at this inextricable web of sense and nonsense, suggestive insight and mischievous error, so jumbled together that the combination of this sagacity with this glaring inefficiency is a paradox and be

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<sup>16</sup> Rankin and Barton, “Tyndall, Lewes, and Popular Representations of Science”, 54, 62, 67.

driven by the anger of opposition into an emphatic assertion that the belauded philosopher is a charlatan and an ignoramus? A chorus of admirers proclaims the author to be a great teacher, before whom all contemporaries must bow; and the critic observes this teacher on one page throwing out a striking hypothesis of some geometric relations in the planetary movements, and on another assuming that the hypotenuse is equal to its perpendicular and base, because the square of the hypotenuse is equal to the squares of its sides - in one chapter ridiculing the atomic theory, and in another arguing that carbonic acid is obtained from carbon and nitrogen - can this critic be expected to join in the chorus of admirers? (147-48).

It is important to remember that Lewes is ostensibly *defending* Dickens in this article, which makes it doubly significant that the popular scientific book Lewes describes, attracting “the attention of Europe” with its “boldness, suggestiveness, and theoretic plausibility of its hypotheses”, is striking and superficial in precisely the ways that Huxley attributed to Lewes. Here Lewes implies that Dickens’s writing is equally riddled with errors and mistakes, surrounded by a similar “chorus of admirers” as that of the popular scientific book. But Lewes hints that, while mistakes might attract the critical censure - as his own “mistakes” had once provoked Huxley - nonetheless, such a writer is “gifted with great theoretic power and occasional insight into unexplored relations”. The hypothetical nature of such writing - made possible by its superficiality - is its strength, however occasional or accidental that strength may prove to be. At this point in the essay, it is hard to tell whether Lewes is talking about Dickens or himself.

Indeed, following Huxley’s emergence as the most vociferous proponent of Darwin’s version of the “development hypothesis” during the 1860s, it might be argued that Lewes was newly emboldened in 1872 to defend the value of a hypothetical, popular style of scientific writing. He now had some cause to think that, however mistaken he might have been in the details in the early 1850s, he had been onto something in the

main. For the text that Lewes is referring to here is very obviously *Vestiges of the Natural History of Creation* (1844). In particular, Barton notes that, if Huxley's attack on Lewes was one of the most "exclusionary" attacks designed to define the "man of science" in the period - nonetheless, "though extreme, it was not unprecedented", for Huxley's review "can be compared with Adam Sedgwick's attack, a few years before, on *Vestiges*", with which it shared "remarkable" similarities.<sup>17</sup> As Huxley would later claim of Lewes (and Lewes would later claim of Dickens), Sedgwick suggested that the author of *Vestiges* was "intensely hypothetical," that his book was effeminate in its "charms of writing," "popularity," and both commendable and damnable in its "ready boundings over the fences of the tree of knowledge".<sup>18</sup> It had been written, Sedgwick guessed, by "a man of imagination" who "delights in resemblances - sometimes real, and sometimes strange," who "hardly seems to know that in the veriest child the perception of resemblances far outstrips the realities of knowledge".<sup>19</sup> His tendency to be "misled by his outer senses" and his "dull inanimate materialism" remind Sedgwick of "when we see a puppet imitate the gestures of a man" or "a calculating machine evolving a regular and complicated series of numbers" like Babbage's difference engine.<sup>20</sup> The striking overlaps between the language of this review and Lewes's characterization of Dickens's childish perception, love of resemblances and puppet-like characters are no coincidence: Sedgwick gave Huxley a language with which to criticize Lewes and stake out his own scientific-cultural territory. In turn, Lewes used this language to criticize Dickens to the

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<sup>17</sup> Barton, "Men of Science," 89

<sup>18</sup> [Sedgwick], *Vestiges*, 3.

<sup>19</sup> [Sedgwick], *Vestiges*, 4-5.

<sup>20</sup> [Sedgwick], *Vestiges*, 66-67.

same ends. Lewes's comparison of Dickens's novels with *Vestiges* is a deliberately crafted strategy.

As Jonathan Smith has recently noted, "no extensive critical effort has been undertaken to assess the relevance for Dickens's fiction of his apparent support for *Vestiges*".<sup>21</sup> In fact, Dickens was one of the few who knew the secret of the book's authorship - Robert Chambers was a publisher and Dickens's friend, and Dickens kept the secret until his death. At the same time, Chambers's many publishing outputs included *Introduction to the Sciences* (1836), which sold over 120,000 in just over a decade, and the socially progressive *Chambers's Edinburgh Journal* - edited between 1847 and 1849 by W.H. Wills, who would marry Janet Chambers and later become Dickens's editor on another campaigning journal, *Household Words*. *Chambers's Edinburgh Journal* had a circulation of over 80,000 in the 1840s. It brought "rational instruction" to a broadly-conceived working-class and lower-middle-class readership, and it was Dickens's closest market rival to *Household Words*.<sup>22</sup> When Huxley wanted to influence press coverage of a proposal for dispersing the British Museum's Natural History collections, for instance, he wrote to a friend: "I have written to Rob. Chambers requesting he will give us an article in Chambers' Journal to show the advantages of our plan for the people - Can you get at the "Household Words"? If one only knew that snob Dickens".<sup>23</sup> Even worse, Huxley's friend and antagonist, the comparative anatomist Richard Owen, *did* know Dickens, and occasionally used the pages of *Household Words* to anonymously vaunt his own scientific positions. *Chambers's* and *Household Words*

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<sup>21</sup> Smith, "Dickens and Astronomy, Biology, and Geology," 409.

<sup>22</sup> See Scholnick, "The fiery cross of knowledge".

<sup>23</sup> As quoted in Dawson, *Show Me the Bone*, 117.

occupied an overlapping position in the print marketplace - a position both coveted and derided by men like Huxley, and both troubling and suggestive to a man like Lewes. As Lewes knew all too well, Dickens and Chambers occupied similar cultural territory.

And it was precisely as a phenomenon of print that Dickens admired *Vestiges* in the first place - as a “remarkable and well-abused” book that “created a reading public not exclusively scientific or philosophical”, but instead “awaken[ed] an interest and a spirit of inquiry in many minds”.<sup>24</sup> He praised *Vestiges* less for its arguments, and more for its power to create audiences, and to reconstitute the grounds on which knowledge had hitherto been made. If Lewes argues that Dickens represented a form of printed communication associated with *Vestiges*, I want to add here that this particular world of print threatened the activities of both Huxley or Lewes - and that Dickens embraced and cultivated his power in this sphere. In the last two decades, as Smith has put it, “what has changed is not our sense of Dickens, but our sense of science”, so that his lack of a laboratory or a stack of Darwinian books no longer automatically rules Dickens out of any serious engagement with science.<sup>25</sup> It is time we cleared the paths of interpretation set by Lewes, and reassessed Dickens’s active role in a wide variety of scientific spheres, practices, and circles that lie outside the “scientific naturalism” of Huxley and those who sought to emulate him.

### **Critical legacies**

The trouble is, that for well over a century after Dickens’s death, Lewes’s story stuck. Perhaps unsurprisingly, George Eliot’s biographer Gordon S. Haight wrote in 1955 that

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<sup>24</sup> [Dickens], “The Poetry of Science,” 787.

<sup>25</sup> Smith, “Dickens and Astronomy, Biology, and Geology,” 418.

Dickens had been “indifferent or hostile to the scientific developments of the age”.<sup>26</sup> At more or less the same time, F.R. Leavis largely discounted Dickens from his “Great Tradition” in terms that directly echoed Lewes’s (minus the science): Leavis praised Dickens for “energy of perception”, “emotional energy,” and “vitality”, but charged him with a lack of intellectual sophistication and claimed his work was childish.”<sup>27</sup> In language more explicitly Aristotelian than Lewes’s, Leavis also made the same point about Dickens’s inability to make general laws from isolated observations. As he put it, Dickens did not have the control to give his work “a unifying and organizing significance” - only in *Hard Times* did Dickens attain anything approaching “a comprehensive vision”.<sup>28</sup>

Nonetheless, beginning with Ann Wilkinson’s 1967 re-evaluation of the spontaneous combustion episode, there has been a longstanding revaluation of Dickens’s engagement with the sciences.<sup>29</sup> And yet the story continues to stick. Over a decade after Wilkinson’s essay, Nancy A. Metz was still compelled to note that Dickens’s “provincialism and gullibility in scientific matters” was “a critical commonplace”, even as she also argued (in what is now the bread-and-butter of Dickens-science criticism), that *Household Words* was full of engagement with the contemporary sciences of “remarkable” “number and variety” - psychological, visual, medical, chemical, and biological, to name but a few.<sup>30</sup> Metz also re-evaluated Dickens’s seeming aloofness from scientific culture, claiming his adjacency to (but not full participation in) it. Dickens

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<sup>26</sup> Haight, “Dickens and Lewes,” 63.

<sup>27</sup> Leavis, *The Great Tradition*, 234, 246, 228, 244, 19.

<sup>28</sup> Leavis, *The Great Tradition*, 19, 228.

<sup>29</sup> Wilkinson, “From Faraday to Judgment Day”.

<sup>30</sup> Metz, “Science in *Household Words*,” 121-22. See also Lai, “Fact or Fancy” for work on science in the periodicals.

consciously shared with his scientific contemporaries, Metz argued, an “energetic curiosity”, a “living interest .... in the mechanics and inner life of everything from a stethoscope to a sawmill”, an “imaginative regeneration” of old myths that gave them new rigour and immediacy.<sup>31</sup> The man of science, and the pioneering literary writer, shared many of the same questions, traits, and techniques. Both were energetic reformers of their age.

And yet eight years later, and despite pioneering scholarship by such authorities as Gillian Beer and Alexander Welsh, still George Levine continued to feel compelled to deal with the fact that “Dickens ... has always seemed too antagonistic both to abstract philosophy and to scientific theory to be considered in relation to it”.<sup>32</sup> Like Metz, Levine argues that “science, for Dickens, was a means to help dispel superstition and ancient prejudice and habit”, adding that in Dickens’s hands, science was always “subservient to human need.”<sup>33</sup> And still it is on the term “energy” that this characterization rests, except that Dickens’s “almost uncontrollable energy for life” is now interpreted not as the antithesis of the scientific spirit, as it had been for Lewes, but as its very definition. No matter that Dickens had only “absorbed, like an intelligent layman, some of the key ideas issuing from contemporary developments in geology, astronomy, and physics,” as has since become the consensus: his energetic engagement in a world in which science was ascendant was enough.<sup>34</sup> No matter either, as Metz put it, that he was “limited and occasionally dated” in his “understanding of specific scientific principles”: Dickens possessed a ready understanding of the ways in which

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<sup>31</sup> Metz, “Science in *Household Words*,” 123, 127.

<sup>32</sup> Levine, “Dickens and Darwin, Science and Narrative Form,” 251. See also Beer, *Darwin’s Plots* and Welsh, *The City of Dickens* - see 117.

<sup>33</sup> Levine, “Dickens and Darwin, Science and Narrative Form,” 254, 258.

<sup>34</sup> Levine, *Darwin and the Novelists*, 124.

science could create new myths, and he responded intuitively to the great developments of his day.<sup>35</sup> Of course, since Levine, an abundance of brilliant and path-breaking research has followed, detailing Dickens's specific engagements with thermodynamics, geology, anatomy, ecology, meteorology, chemistry, optics, forensics, mesmerism, medicine, psychology, and the social sciences.<sup>36</sup>

And yet, despite all this work, it is *still* not uncommon to find it suggested that Dickens's scientific reading was "nugatory".<sup>37</sup> "Dickens and science remains a provocative combination," as Holly Furneaux and Ben Winyard put it in 2010.<sup>38</sup> "Despite the friendly feeling between Dickens and Lewes, their attitudes drifted apart as the center of Lewes's and Eliot's intellectual interests moved from metaphysics to science", another critic has recently written.<sup>39</sup> The comparison between Dickens and Lewes, or Dickens and Eliot, lives on, and it draws sustenance from that word "energy". So widespread as to appear natural as a term for describing the essential quality of Dickens's prose, "energy" suggests that Dickens was absorptive of scientific knowledge, but not self-consciously engaged in its creation, communication, or contestation. Such a

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<sup>35</sup> Levine, *Darwin and the Novelists*, 126-27.

<sup>36</sup> This list is by no means exhaustive. But see, for some major examples: Frank, *Victorian Detective Fiction and the Nature of Evidence*; Mangham, *Dickens's Forensic Realism*; Morgentaler, *Dickens and Heredity*; Boehm, *Charles Dickens and the Sciences of Childhood*; Bown, "What the Alligator didn't Know"; Fulweiler, "A Dismal Swamp"; Taylor, *The Sky of Our Manufacture*; MacDuffie, *Victorian Literature, Energy, and the Ecological Imagination*; Gold, *ThermoPoetics*; Henschman, "Tallow Candles and Meaty Air in *Bleak House*"; Gales, "Charles Dickens and Fire Science"; Buckland, "The Poetry of Science" and "Pictures in the Fire"; Kuskey, "Our Mutual Engine"; Connor, "All I Believed is True"; Kaplan, *Dickens and Mesmerism*; Yeats, "Dirty Air"; Groth, "Reading Victorian Illusions"; Henson, "Phantoms Arising from the Scenes of Our Too-Long Neglect"; Ingleby, "Chemistry Versus Biology", and so on. For a fuller list, see the bibliography to this essay.

<sup>37</sup> O'Gorman, *The Victorian Novel*, 252. For an earlier example, see Fielding, "Dickens and Science?"

<sup>38</sup> Winyard and Furneaux, "Dickens, Science and the Victorian Literary Imagination," 2, <<file:///C:/Users/k1202098/Downloads/572-724-1-PB%20(2).pdf>>.

<sup>39</sup> Hollington, "Dickens and Literary Culture," 467-68. Lowe, in "Dombey and Son," 178, writes of Dickens's attack in *Dombey and Son* on "the rising mid-Victorian confidence in the all-conquering power of science, of empire, of progress, and most of all, of money", in an introduction to Dickens which mentions science only in relation to his "disparaging satires" on the British Association in the Mudfog Association reports (Drew, "Dickens's Evolution as a Journalist," 178).



term enables us to consider science at the rather hazy, abstract level of “ideas”, rather than at the level of practice, instrument, performance, technique, discussion, communication, and experiment - the tangible activities that constituted scientific work. Most of all, “energy” and “vitality” were precisely the words deployed in the defences of Lewes and Leavis, that rescued Dickens from his critics precisely by *opposing* him to serious intellectual culture. These terms repeat the old fault lines by refashioning Dickens as a vibrant figure immersed in science - even critical of it in a very general sense - but *intellectually* outside its purview.

### **Knowledge in Transit**

Only by viewing communication as a form of scientific practice that actually constitutes scientific knowledge can we begin to recover Dickens’s active, pivotal role in Victorian scientific culture. To do this, here I will offer a review of many already well-known examples of Dickens’s interventions in science, bringing their role in the creation of new knowledge more sharply into relief. Perhaps the most obvious case of a claim for Dickens’s scientific prowess comes from an obituary published in the *British Medical Journal* in 1870s, lauding Dickens’s writing as medically astute. Dickens was often critical of medics and his work contained many fictional portraits of bad doctors, the article acknowledged, so that “we ourselves could well afford to laugh with the man who sometimes laughed at us”. But his characters and incidents were so “true to Nature, even to their most trivial details” that only “medical men” were equipped to “judge of the rare fidelity with which he followed the great Mother [Nature] through the devious paths of disease and death”:

It must not be forgotten that his description of hectic (in *Oliver Twist*) has found its way into more than one standard work, in both medicine and surgery' or 'that he anticipated the clinical researches of M. Dax Broca, and Hughlings Jackson, on the connection of right hemiplegia with asphasia (*vide Dombey and Son*, for the last illness of Mrs. Skewton); and that his descriptions of epilepsy in Walter Wilding, and of moral and mental insanity in characters too numerous to mention, show the hand of a master.<sup>40</sup>

The passage on hectic fever is actually found in *Nicholas Nickleby* rather *Oliver Twist*, though it is true that medical students learning about fever from either William Aitken's *The Science and Practice of Medicine* or James Miller's *Principles of Surgery* would have found excerpted a passage from, as Aitken put it, "the non-professional pen of our great novelist, Mr. Charles Dickens," who "has beautifully portrayed its more striking features in the death of Smike".<sup>41</sup> In the passage Aitken excerpted, the narrator of *Nicholas Nickleby* describes "the sunken eye" of Smike, observed to be "too bright, the hollow cheek too flushed", portending "a dread disease" in which "the spirit grows light, and sanguine with its lightening load; and feeling immortality at hand, deems it but a new term of mortal life - a disease in which death and life are so strangely blended that death takes the glow and hue of life, and life the gaunt and grisly form of death".<sup>42</sup> The passage moves from particular case to the general narrative of a disease, and shares much with the structure and tone of mid-nineteenth-century medical case studies.<sup>43</sup> But more interesting is the fact of its expectedness, the seemingly-mechanical and repetitious features as Lewes had identified them in Dickens's prose, and which had seen Dickens come in for the kind of critical disapprobation from which Lewes sought to

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<sup>40</sup> [Ernest Abraham Hart], "Obituary," 636.

<sup>41</sup> Aitken, *The Science and Practice of Medicine* I: 105. Miller, *Principles of Surgery*, 44.

<sup>42</sup> Dickens, *Nicholas Nickleby*, p. 481.

<sup>43</sup> Dickens, *Nicholas Nickleby*, p. 481.

defend him. The passage is structured around: a visual and physiognomic set of paradoxes (the dead-alive, alive-dead quality of the sufferer); a hyperbolically sentimental attachment to immortality, despite a quite careful rendering of anatomical wasting underscored by gaudy alliteration (“gaunt and grisly”, “dread disease”); and closely-realised attention to the superficial symptoms of the illness (the sunken eye, the flushed cheek). These syntactic, descriptive and rhythmic qualities not only describe the particular patterns of a specific disease, but function as familiar features of Dickens’s prose: rhythm and repetition imply both medical generalization and a stylistic signature. And this is precisely what makes it useful to the medical textbook: while not all medical students could be expected to know the details of very specific individual cases from medical reports, nor to have yet acquired enough familiarity with particular diseases to view them on a large-scale statistical level, all could be expected to recall the figure of Smike, both because he is a character from a famous novel and because the vividness and repetitiousness of Dickens’s prose made the details of his disease all the more memorable. The stylistic formulas so reviled by Dickens’s critics serve too to make the patterns of disease, their detection, and the appropriate emotional response required of their observers seem familiar enough to be self-evident. In passages like this, both the repetitious and hyperbolic features of Dickens’s prose, as well as the seeming ubiquity of his characters, establish cultural and prescriptive norms around disease. With Secord in mind, we can take this a step further: Dickens’s communicative powers (both as a writer

and as a publisher) also give his prose the power to stabilize forms of medical diagnosis, pedagogy, and detection.<sup>44</sup>

Andrew Mangham has argued, somewhat differently, that Dickens's writing was shaped by his engagements with forensic science, with its central tension between 'the law's need for certainty and medicine's need for doubt', and that Dickens was ultimately more interested in the doubt, in the many-layered perspectives through which truth might be filtered.<sup>45</sup> This, indeed, is what gave him the confidence to argue with Lewes over spontaneous combustion: he rejected Lewes's positivist definition of medical and scientific truth. I see my argument here rather enriching Mangham's point than contradicting it, for Dickens's prose was useful to medical teachers and students not only for its perceptive observations around disease, but for the richly interpretive mode of its descriptions. Repetitious enough to build the kinds of patterns that would facilitate the stability of meaning required for accurate diagnosis or detection of a disease, they were nonetheless literary enough to accommodate new developments in medical knowledge, or to invite contemplation of the conflicting points of view of doctors, patients, or relatives.

The point is made even more clearly if we consider the other examples mentioned in the *British Medical Journal* obituary, - from that of "Mrs Skewton's last illness", in which Dickens associates right-handed paralysis with speech loss, to that of the oft-cited "Pickwickian syndrome", a sleep disorder named as such by a group of American sleep scientists in 1956. William Osler's influential 1892 *The Principles and Practice of*

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<sup>44</sup> For a much deeper and richer analysis of the mnemonic powers of Dickens's writing as they relate to Dickens's celebrity, associationist psychology, serial form, and the collective and social bonds Dickens's prose forged among its readers, see Sarah Winter, *The Pleasures of Memory*.

<sup>45</sup> Mangham, *Dickens's Forensic Realism*, p. 85.

*Medicine* noted that “a remarkable phenomenon associated with excessive fat is an uncontrollable tendency to sleep - like the Fat Boy in *Pickwick*”, putting “this narcolepsy” down to “a manifestation of disturbed internal secretions”.<sup>46</sup> The 1956 authors in the *American Journal of Medicine* article quote almost a page of excerpts from *Pickwick Papers* and include Thomas Nast’s drawing of the “Fat Boy” for the novel, stating that “the association of obesity, somnolence, polycythemia and excessive appetite” found its first and most “classic description” in Dickens’s novel, which offers a “masterful description ... of a patient with marked obesity and somnolence” - “the first complete description ... we have been able to find in the literature”.<sup>47</sup> In both the Skewton and Fat Boy cases, Dickens observes a confluence of two seemingly unrelated symptoms: paralysis with speech loss, and obesity with sleep and breathing disorders. And in both cases we ought to avoid the assumption that Dickens was a prophet who successfully predicted future medical advances (as is often implied in a slew of articles identifying Dickens as the first describer of diseases that did not yet exist in the medical literature - from dyslexia to epilepsy to trachoma).<sup>48</sup> Instead, we might reaffirm that the particular rhythms of Dickens’s prose - features which made his characters both eccentric and instantly recallable across instalments - made his writing useful for medics seeking to describe newly-understood diseases, to give shape to little-understood and often paradoxical-seeming biological processes, and to provide a shared cultural pool of

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<sup>46</sup> 441.

<sup>47</sup> Bickelmann et al, “Extreme obesity,” 812.

<sup>48</sup> Again, this list is not exhaustive. But for a handful of examples, see Kryger, “Fat, sleep and Charles Dickens”; Kryger, “Charles Dickens”; Schoffer and O’Sullivan, “Charles Dickens”; Markel, “Charles Dickens and the Art of Medicine”; Cosnett, “Charles Dickens and Epilepsy”; Jacoby, “Krook’s Dyslexia”; Margo and Harman, “Charles Dickens, Trachoma, and Blindness in Pre-Victorian England”; Pahor, “Charles Dickens and the Ear, Nose and Throat”; Gardner, “The Endocrinology of Abuse Dwarfism”; Larner, “Did Charles Dickens Describe Progressive Supranuclear Palsy in 1857?”

(fictional) case studies on which to draw as a new medical community was forged. The fictionality mattered. As Lewes put it, Dickens's "types established themselves in the public mind like personal experiences ... Every humbug seemed a Pecksniff, every nurse a Gamp, every jovial improvident a Micawber, every stinted serving-wench a Marchioness".<sup>49</sup>

Importantly, the medical community was also working hard, in this period, to prove to a sceptical public both its social respectability and its ability to produce practical results. The *British Medical Journal* obituary was likely written by its editor, Ernest Abraham Hart, who was then on an aggressive mission to turn the *BMJ* from a shaky provincial publication with a low circulation to "a powerful shaper of public opinion", a transformation which occurred "largely through its campaigns against perceived evil".<sup>50</sup> A reformer more radical than Dickens, working indefatigably on such issues as workhouse reform, anti-adulteration of food, and the 1872 Infant Life Protection Act, Hart had also been a regular contributor to *Household Words*, writing such articles as "Chip: the History of a Coal Cell" (1853), "The Lives of Plants" (1854), and "Nature's Greatness in Small Things" (1857). No stranger to scandal - his first wife was suspiciously poisoned in 1861 - Hart had just returned to work on the *BMJ* when he wrote the Dickens obituary, having been caught in 1868 with his hand in the till.<sup>51</sup> In this context, Dickens performs a dual function for Hart as he begins to transform the *BMJ*: Dickens the popular social campaigner is a useful figure through which to redefine both medicine and the *BMJ* as socially *respectable* agents of reform. Dickens can stand

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<sup>49</sup> Lewes, "Dickens," 146.

<sup>50</sup> Behlmer, "Ernest Hart," 711.

<sup>51</sup> Behlmer, "Ernest Hart," 711.

as a symbol of the intellect, compassion, and dedication of all medical reformers. In this reading, his criticisms of bad doctors are a token both of his healthy scepticism and of the *BMJ*'s new-found ability to reflect honestly on the shortcomings of the profession. The obituary functions less as proof of Dickens's virtuoso performances in medical description, and more of his usefulness to a medical journal in a position of precarity. Dickens-as-medic is at least in part the function of a *publishing* relationship. This is not to downplay Dickens's significance as a medical writer: it is to say that science and scientific communication are part and parcel of one another.

### **Chemical communications**

The *quid pro quo* of such science-print relationships is exemplified in another well-known example: Dickens's procurement of Michael Faraday's 1848 Royal Institution Christmas lectures notes on the chemistry of a candle for republication as short stories in the fledgling *Household Words*. Furthermore, this example suggests not only that science and communication are co-constituents of one another, but that *Dickens understood them as such*. Dickens viewed the constitution, distribution and movements *of matter* as acts of communication which could be actively shaped by other (often printed) communicative acts.

Dickens's original request to Faraday was written with the definition of a new reading public in mind: "it has occurred to me," he said, "that it would be extremely beneficial to a large class of the public to have some account of your late lectures on the breakfast-table, and of those you addressed last year, to children. I should be extremely glad to have some papers in reference to them, published in my new enterprise

Household Words”.<sup>52</sup> It would be “extremely beneficial” to Faraday - whose lectures were already engaging broad middle-class publics, including women and children - to have his work in *Household Words*, Dickens suggests. But it would be extremely beneficial to the “new enterprise”, too, which was designed to publicize social and sanitary causes. The implication is that those causes are of mutual benefit to one another: that chemical research, and sanitary campaigns, might be symbiotically-related.

Indeed, Dickens wrote to Faraday on December 11 1850 to thank him for “generously lending” the “valuable notes” - which were “not so easily exhausted” as he had first thought. They would be kept for a little longer by Dickens’s writer Percival Leigh, who had been so inspired by them as to write articles on the chemistry of additional household objects - a chest, a tea kettle, and a pint of beer.<sup>53</sup> Further research has revealed the extent to which *Household Words* and *All the Year Round* took interest in the sciences of heat, energy, ozone, and combustion, including, for instance, a review of John Tyndall’s Royal Institution Christmas Lectures in 1865, which described the republication of the lectures Tyndall’s writing as an “enchanter’s wand”.<sup>54</sup> As with the Faraday stories, the democratic impulse looms large: Tyndall is praised for having brought the new philosophy of energy “within the reach of persons of ordinary intelligence and culture”.<sup>55</sup> The article repeats the lectures’ simple demonstrations, in which puffs of breath or hammers on anvils could reveal the grandest laws of physics.

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<sup>52</sup> Dickens to Michael Faraday, May 28 1850, in *Letters of Charles Dickens: 1850-52*, 106.

<sup>53</sup> Dickens, *Letters* 6, 220.

<sup>54</sup> [Anon.], “Is Heat Motion?”, 534.

<sup>55</sup> [Anon.], “Is Heat Motion?”, 534.



This domestic brand of science seeks to create a readership whose active participation in scientific knowledge is a means to the scientific transformation of society.

This was of interest to Dickens precisely because it helped with the *communi-*  
*creation* of new medical and sanitary knowledge it was the stated business of *Household Words* to achieve. As Henson has convincingly argued, “disease was viewed as a problem of chemistry” in the sanitary movement in which Dickens, as brother-in-law to Henry Austin (Secretary to the Board of Health from 1848 and advisor on many public health articles in *Household Words*) took on a role as communicator. To take one example, Justus von Liebig’s views on putrefaction as a vital component of mineral renewal were endorsed by Hart, though by the 1840s it was becoming clear that organic matter accumulated unhealthily in urban streets, cesspools and churchyards, causing disease rather than fertilization.<sup>56</sup> Henson reveals that the theory that city air contained a polluting level of animal matter in it, Reichenbach’s mysterious *odyle* as chemical manifestations emitted by living human bodies and decomposing corpses, and G.A. Walker’s exposure of the pestilential nature of London overflowing burial grounds (all discussed in Dickens’s journals), produced an idea that ghosts were miasma, rising from discarded corpses. Or, as Dickens put it, “dead citizens have got into the very bellows of the organ, and half choked the same. We stamp our feet to warm them, and dead citizens arise in heavy clouds. Dead citizens stick upon the walls, and live pulverised on the sounding-board over the clergyman’s head, and, when a gust of air comes, tumble down upon him”.<sup>57</sup> I would add that the problem of dead citizens here is *simultaneously* a chemical and communicative one - in which the dead speak from beyond the grave as

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<sup>56</sup> Henson, “Phantoms Arising”, 7.

<sup>57</sup> Dickens, “Uncommercial,” 86. As cited in Henson, 14.

presences decomposing and recomposed by unexpected movements (on shoes, on gusts of air) through urban space.

Even more importantly, *Household Words* emerged just after a decade in which, as Matthew Ingleby reminds us, “chemistry was continually in the public eye and at the centre of debates about overpopulation” for challenging “pessimistic predictions of resource finitude by promising vastly increased crop yields”, countering “Malthusian logic”.<sup>58</sup> Dickens wrote in a letter on 24 August 1851 that “I wish I could be there to meet Baron Liebig, one of the greatest men in Europe, and in whom I am (as who is not?) most strongly interested”.<sup>59</sup> In “The Poor Man and his Beer” Dickens also praised John Bennet Lawes, praising him “for his pragmatic and generous attitude toward working-class drinking” and as a chemist who helped find chemical manures for fertiliser. “It seems reasonable to extrapolate,” Ingleby notes, “that Dickens saw chemists such as Lawes and Liebig as part of a liberal-progressive alliance in which he himself participated, recognizing that chemistry was engaged in resisting social theories that left no role for social (and by extension, technological) agency in the cause of human amelioration”.<sup>60</sup> As such, chemistry had a special role to play in debates about social and sanitary reform, which required the urgent action of myriad ordinary householders: for sanitation measures to work, everybody had to clean up their acts. The communication of disease *was* the communication of ideas. Flows of objects, materials, goods and knowledge, if not circulated properly, might stick to the walls, gust on air, clog the feet, and disease the body. Atoms move not merely as atoms will move. They move in the

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<sup>58</sup> Ingleby, “Chemistry Versus Biology,” 108, 109.

<sup>59</sup> As quoted in Ingleby, 109.

<sup>60</sup> Ingleby, 109.

cracks, the crevices, the channels and the pathways that society creates for them, in the gaps that communication - or a lack of it - opens up. In such a system, ignorance means death. And print - as Dickens knew well when he wrote to Faraday - forces open (or, improperly used, closes down) the proper circulation of such entities as knowledge and sewage all at once.

Once we see it this way, Dickens as scientific communicator - opening up and defining new fields of scientific knowledge, and new objects of scientific inquiry - appears everywhere. In 1842, Dickens was directly asked to promote the Commission and Inquiry into Children and Mining. In a series of damning articles in the *Morning Chronicle*, he offered it his support. In these articles Dickens made explicit, by making public and making vivid, the links between individual “accidents” in the mines and the structural and social inequalities that had made them so frequent. As Rosa Buckland has demonstrated, in attempting to persuade parliament and the public of the need of legislation to protect children from harsh labour conditions, Dickens was instrumental in transforming the idea of “accident” from an act of Providence into an object of scientific and social research, capable of prevention and of causation by systematic means.<sup>61</sup>

A similar impulse can be seen in the famous essay “Drooping Buds”, which Dickens co-authored for *Household Words* in 1852 with the writer and medic Henry Morley, in order to raise funds for the East London Children’s Hospital. A later article on children’s hospitals, “From the Cradle to the Grave”, deployed the same successful strategy.<sup>62</sup> As Katharina Boehm has pointed out, this latter essay imagines “an unbroken

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<sup>61</sup> Also see Fyfe.

<sup>62</sup> See Boehm, *Charles Dickens and the Sciences of Childhood*, chap. 3 (pp. 79-111) and chap. 4

line of” the “corpses” of children, “lying head to foot, along the kerb-stone on each side of the way, from Bow Church down the Bow-road, through Mile-end, and down the Mile-end road, Whitechapel road, Whitechapel” ... “the whole length of Holborn and Oxford-street, to beyond Kensington gardens”.<sup>63</sup> The essay mimics the form of cholera maps produced by John Snow and other early attempts to map the social geographies of disease. And it anticipates, of course, the form of *Bleak House*, which dismantles isolated “worlds” and discrete cosmologies, replacing them with mapped relations in which the streets are re-imagined as arteries for disease, pumped by a corrupt and negligent City. The very articulation of those connections between seemingly-discrete parts of London offers a form of cure, rendering hitherto invisible forms of connection as *objects* of scientific inquiry. Writing becomes a mode of disease prevention, and a mode of detection, of giving narrative form to mysteriously moving diseases, to the social and geographic causes of neglect, accident, or illness, and to the invisible powers - not now acts of God, but traceable and communicable forms of social and environmental connection - which have the power to transform lives.

This communi-creation of scientific objects and knowledge is manifest in a passage from *The Uncommercial Traveller*, first published as an essay in *All the Year Round* in 1862: Writing of a group of children gathered in the street, Dickens writes that a “genuine police-constable” suddenly appears to break them up,

before whom the dreadful brood dispersed in various directions, he making feints and darts in this direction and in that, and catching nothing. When all were frightened away, he took off his hat, pulled out a handkerchief from it, wiped his heated brow, and restored the handkerchief and hat to their places, with the air of a man who had discharged a great moral duty,—as indeed he had, in doing what was set down for him. I looked at him, and I looked about at the disorderly traces in the mud, and I thought of the drops of rain and the footprints of an extinct creature, hoary ages upon ages old, that

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<sup>63</sup> [Anon.], “From the Cradle to the Grave,” 454.

geologists have identified on the face of a cliff; and this speculation came over me: If this mud could petrify at this moment, and could lie concealed here for ten thousand years, I wonder whether the race of men then to be our successors on the earth could, from these or any marks, by the utmost force of the human intellect, unassisted by tradition, deduce such an astounding inference as the existence of a polished state of society that bore with the public savagery of neglected children in the streets of its capital city, and was proud of its power by sea and land, and never used its power to seize and save them!<sup>64</sup>

The most obvious scientific contexts here are the forensic and the geological, as Dickens deploys the language of “speculation” and “inference”.<sup>65</sup> The geological metaphor for the petrification of Victorian society is reminiscent, too, of Dickens’s more famous 1848 review of Robert Hunt’s *The Poetry of Science* in which he imagined “sirens, mermaids and shining cities glittering at the bottom of the sea”, the stories of the *Arabian Nights* and of fairy tales, replaced by new but equally awe-inspiring knowledge of the construction of coral reef, chalk cliffs, limestone rocks and “the bones, and ... skeletons, of monsters that would have crushed the noted dragons of the fables at a blow”.<sup>66</sup> But of course, like the megalosaurus, this passage in *The Uncommercial Traveller* is darker in tone and social import than those texts suggest. It is built around the inadequacy of geology to account for those invisible social ills Dickens made tangible through narrative: the nation’s “power by sea and land”, its ships and trains, would likely to be revealed in the fossil record of the future geologist. But the children chased by the policeman - already ephemeral, a “dreadful brood dispersed in various directions” and

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<sup>64</sup> [Dickens], “On an Amateur Beat”, 301.

<sup>65</sup> See Frank, *Victorian Detective Fiction and the Nature of Evidence*.

<sup>66</sup> It is of a piece, too, with many articles in *Household Words* and *All the Year Round* which drew on the popularity of the textbooks of David Page (which turn a husband so geologically-obsessed that he turns his wife’s linen drawers into a geological cabinet), the writings of Charles Lyell to time-travel into distant geological epochs or direct readers to the best fossil-gathering ground on the Isle of Sheppey, and instructed them to look at Henry De la Beche’s “*Duria Antiquior*” - perhaps the most famous artistic reconstruction of the prehistoric world - in an 1865 article on Mary Anning. See, for examples: “England Long and Long Ago”, “Mary Anning, the Fossil Finder,” “Hammering it In”, “A Leaf from the Oldest of Books”, “What is to Become of Us?”, and “Our Ship on an Antediluvian Cruise”.

turning to “nothing” - appear as less than “the drops of rain and the footprints of an extinct creature”. The policeman’s duty is to turn these children from a “dreadful brood” into a nothingness that leaves no trace. And yet, the thing that would be lacking from the fossil record that might be left behind of this age is not the children, but the social hypocrisy that registers neglect *as* duty, “the existence of a polished state of society that bore with the public savagery of neglected children”. The children materially exist, like the ships and the trains, but the invisible thing that drives the scene eludes scientific research, because it is *neglect* (another abstract noun, like “accident”, that Dickens imagines as requiring widespread communication in order to be *seen* as an object of scientific scrutiny). As such, *writing* records what the mud cannot, and the reader becomes aware of entities of which the geologist remains barely (if at all) cognizant. As Helen Groth has recently put it, drawing on Richard Menke’s arguments in *Telegraphic Realism*, “Dickens implicitly and explicitly asserts the novel as an alternative system for storing and transmitting images, and for rendering visible what other information systems could not, a character’s inner thoughts or the secret workings of social, legal or economic structures”.<sup>67</sup> Tellingly, Groth makes this point while referring to the geologically-inflected passages of the description of Stagg’s Gardens in *Dombey and Son* and the megalosaurus waddling up Holborn Hill in the opening scene of *Bleak House*. Geological data loss, information retrieval, and fictional communication are deeply interconnected in Dickens’s work, so that the novel becomes a work of scientific communication in an age in which the proper objects of scientific inquiry have not, Dickens contends, been established along empathetic or imaginative enough lines.

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<sup>67</sup> Groth, “Dickens’s Visual Mediations”, 691-92.

## **A return to *Vestiges***

Dickens saw print and matter as mutually-constitutive, then, flowing in similar channels and currents and each affecting the other. But the final point to make is that Dickens himself deliberately embodied the power of print as an unwieldy, recalcitrant and sometimes frightening agent in its own right - an agency that was often felt to elude scientific control or analysis. And if there was a text that summed up the sensational powers and dangers of print in Dickens's lifetime, it was *Vestiges*.

Indeed, Lewes was not the only writer to make the comparison between Dickens's writing and that famous text. As Sally Shuttleworth has recently demonstrated, *Dombey and Son* "became a key text" in debates about "over-pressure" on children as they were played out by such figures as Robert Brudenell Carter and James Crichton Browne (President of the Royal Medical Society of Edinburgh) in the 1880s and beyond.<sup>68</sup> And, as Carter put it in *On the Influence of Education and Training in Preventing Diseases of the Nervous System* in 1855,

There are few people who have not read the graphic account of little Paul Dombey's intellectual perplexities: - "When poor Paul had spelt out number two, he found he had no idea of number one; fragments whereof afterwards obtruded themselves into number three, which slid into number four, which grafted itself on to number two. So that whether twenty Romuluses made a Remus, or hic haec hoc was troy weight, or a verb always agreed with an ancient Briton, or three times four was Taurus a bull, were open questions with him." Confusion such as this, it may be hoped, exceptional; but a state of mind not altogether unlike it has been produced, in many people, by blending together the several matters treated of in such books as "Vestiges of the Natural History of Creation" or "The Plurality of Worlds".<sup>69</sup>

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<sup>68</sup> Shuttleworth, *The Mind of the Child*, 131.

<sup>69</sup> Carter, *On the Influence of Education*, 428.

Carter invokes *Vestiges* in its readily-recognizable interpretation as a text rendered famously fragmentary (as Sedgwick had so memorably argued) by its “blending together” of “several matters” - its lack of depth and purpose in mastering a single discourse, instead stitching together a variety of little-understood sciences into a seemingly compelling but ultimately disjointed whole. But here, Dickens is not the *producer* of such a form of thinking but the *dramatizer* of its pernicious effects in a hothousing education system. He is the revealer of crimes produced by the kinds of popular and fragmentary forms of knowledge considered to be destroying both education and society. The example is important because it reminds us that neither Dickens nor Lewes was advocating a fully democratic model of knowledge-production: while both championed (quite different) participatory visions for science, both also courted varying degrees of social and scientific respectability that entailed various kinds of exclusion for those deemed too unintelligent or uneducated to count, and had particular ideas about how the requisite qualifications for participation might be acquired. It is important too because it reminds us that scientific battle lines drawn around both *Vestiges* and Dickens were drawn very differently depending on the rhetorical contexts in which they were invoked: sometimes Dickens was aligned with *Vestiges* and against scientific culture, sometimes opposed to it - his novels drawn in as scientific evidence in a debate.

And finally, there is a third term the Dickens-*Vestiges* connection that makes clearer the relation between printed communication and scientific knowledge in Dickens’s writing: and that term is mesmerism. A form of hypnosis involving the passing of hands close enough to the subject that you could feel her body heat,



mesmerism was perhaps the scientific activity with which Dickens was most concretely engaged, attending both private and public demonstrations of mesmerism conducted by John Elliotson at University College London in 1838, and sticking by Elliotson even after he was discredited in *The Lancet* and resigned from his post at UCL later that year.<sup>70</sup> As Alison Winter has pointed out, many readers and auditors of Dickens's prose and performances considered themselves to have been mesmerized by the author.<sup>71</sup> He learned to practise mesmerism, concluding that he was powerful enough to "magnetize a frying pan", and acted in Elizabeth Inchbald's mesmeric farce, *Animal Magnetism*, at Rockingham Place. Furthermore, mesmerism was frequently associated with *Vestiges*. In a damning critique of *Vestiges* for the *North British Review* in 1845, for instance, David Brewster had written, in terms that preempt Carter's account of *Vestiges* in the overpressure debate, that "there is a condition of mind, the result of education and natural temperament, peculiarly open to the reception of novel and easily comprehended doctrines. Its leading feature is its impatience of that slow inductive process by which great truths are established by one mind, and through which they are demonstrated to other minds of similar character, though unequal power". The female mind in particular lacked the "rough phases of masculine strength which can sound depths, grasp syllogisms, and cross-examine nature," and "hence it is that doctrines such as those of Phrenology and Mesmerism have collected their followers chiefly from one sex". Women were "the most numerous and ardent admirers of The Vestiges of Creation," he claimed, perusing "it in the boudoir and the drawing-room".<sup>72</sup> Mesmerism

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<sup>70</sup> See Kaplan, *Dickens and Mesmerism*; Connor, "All I Believed is True".

<sup>71</sup> Winter, *Mesmerized* - esp. 57-59, 322

<sup>72</sup> *Vestiges*, 1846, 334.

and *Vestiges* are equated with a superficial (feminine) form of knowledge and with a lack of patience for the “slow inductive process” by which truth is both “established” and communicated “to other minds”. Communication and knowledge emerge as one, and in terms that instantly recall Lewes’s critique of Dickens’s speedy, hallucinatory, feminine prose.

Furthermore, in the same year that Sedgwick reviewed *Vestiges*, and an article in *Blackwood’s Edinburgh Magazine* bemoaned the “many crude, illiterate, and unphilosophical speculations on the subject of mesmerism which the present unwholesome activity of the printing-press has ushered into the world”.<sup>73</sup> Its complaints were typical, connecting the print press, “unphilosophical speculations”, and mesmerism, suggesting not only that print publicized mesmerism, but that mesmeric and printed agencies were alike in kind: violable, indistinct and dangerous. As Winter writes, in mesmerism “Victorians were not merely testing the reality of a particular phenomenon or the veracity of a particular person; they were carrying out experiments on their own society”.<sup>74</sup> For “deciding what the phenomena meant required that one assert what one thought social relations were, or ought to be”.<sup>75</sup> Mesmerism raised a series of troubling questions in a society increasingly conducted through print: could one person be bent to another’s will? By what means, and how effectively? How could such control be resisted, and on what scale? How was knowledge to take hold not only of the hearts and minds of readers or of mesmeric subjects - but of their bodies? How might the transfer of information literally *reshape* the body - making the sick well again,

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<sup>73</sup> [Grove], ‘Mesmerism’, 29.

<sup>74</sup> Winter, *Mesmerized*, 4.

<sup>75</sup> Winter, *Mesmerized*, 67.

calming nervous affliction, or gifting foresight and knowledge to either the mesmerized subject or the mesmerizing agent? How might that transfer shape not only what is known, but what is *knowable*?

As such, debates about mesmerism were always also debates about the power of communication - particularly about the power of printed communication, with its similarly intangible abilities to shape the minds and bodies of readers (if only ever in unpredictable ways). Offering unprecedented modes of access to knowledge and power through fast, unstable, esoteric channels of communication, mesmerism and print were combined symptoms of a new age - an age whose simultaneously intoxicating and damaging properties were symbolized by *Vestiges*.

Perhaps unsurprisingly, Dickens embraced the unstable properties of both print and mesmerism, if only for the challenge they presented to his ability to control and direct them. The poet and mesmerist Chauncy Hare Townshend, to whom Dickens dedicated *Great Expectations*, refers to the mesmerist as a “conductor”, specifically of sound, four times in his book *Facts in Mesmerism* (“in the case of Mademoiselle M ----, as being a perfect sleepwalker, the insulation from all sounds of which I was not the conductor was complete,” he says, in a typical instance).<sup>76</sup> As the self-vaunted “conductor” of *Household Words*, Dickens too sought to offer both principles of direction and insulation for his readers, to marshal and control powers of language and currents of thought that he ultimately recognized as not entirely belonging to him, but which he might learn to control. For Dickens, mesmerism and print alike offered him forms of directing the strange, powerful and unpredictable forces through which

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<sup>76</sup> Townshend, *Facts in Mesmerism*, 143. See also pages 218, 377, 396, 508. In the first four instances, it is *sound* that is specifically conducted.

cultural, social and personal health were to be managed and directed. And if he admired *Vestiges*, it was for its success in appropriating some of that power.

Recently, Jesse Oak Taylor has imagined Dickens as a writer who used the form of the novel to play out his sense of a kind of “distributed agency”, to use Jane Bennett’s terms, to critique the dispersal of social responsibility across myriad individual actors that has contributed, in particular, to climate change. As Taylor puts it, this is “a rethinking of agency, which can no longer be understood as the exclusive province of the individual (or exclusively human) subject ... the assemblage, an entangled collective of human and nonhuman actors”, and which “provides a useful conceptual rubric for reevaluating the weird, abnatural realism of Charles Dickens”.<sup>77</sup> As such, he considers Dickens as a documenter of the wildness of the city, and of the distributed agencies that contribute to pollution and disease, in ways that overlapped with scientific discourse. I want to add here that this “distributed agency” is also associated with print, and might be a useful term with which to sum up the threat of *Vestiges* to the kind of elite men of science whom Lewes hoped to impress - from Sedgwick to Huxley. In its anonymous authorship and its rapid proliferation across readerships it summed up precisely the powers of a rapidly-expanding print culture to disperse both authority and responsibility for the printed word. Through both authorship and the conducting of mesmeric fluids Dickens was excited both by the possibilities of control *and* the *inability* of the individual mesmerizer, or author, ever to wield that control in its entirety. Those authorities - symbolized by the policeman in *The Uncommercial Traveller* - who sought to stamp too much authority, did little but cause unpredictable

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<sup>77</sup> Taylor, *The Sky of Our Manufacture*, 24 and 27. See also Bennett, *Vibrant Matter* (2010).

social forces to disperse and proliferate in new spaces. And too close an attempt to control a readership might alienate it. Winning at print, as succeeding at mesmerism, as organizing society in a meaningful and humane way, meant ceding control to the distributed agencies and forces of the market or of the magnetic fluid, “conducting” their course without controlling them completely. Dickens summons up invisible objects and reveals their hidden circulation through the city in ways that reveal them as unconquerable, but redirectable to useful ends.

In this reading, mesmerism is a powerful Victorian scientific practice that was both central to Dickens’s thinking, and indicative of the rhetorical position Dickens both symbolized and staged in mid-Victorian science. If Dickens is the vocal exponent of mesmerists, spontaneous combustionists, sanitary campaigners, early development hypothesizers, and fantastical engineers, this does not disqualify him from a central place in Victorian scientific culture. Nor does it make him an energetic but unwitting absorber of scientific knowledge, prone to getting it “wrong”. On the contrary, it is *precisely* what made Dickens such a potent headache for Lewes, symbolizing the power of print in a scientific age to define science in terms close (and yet distinct) enough to Lewes’s to threaten his entire enterprise. Acknowledging these cultures as equally “scientific” as those of evolutionary biology or physics or of the “scientific naturalists” with whom Lewes hoped to ingratiate himself, reveals how interconnected, sustained and coherent Dickens’s scientific vision was throughout his career. The scientific vision Dickens promoted was not accidentally imbibed from the wider culture by his energetic proximity to it. It was a carefully-crafted, even dogmatic, vision of the role and nature of scientific understanding in a rapidly-transforming literary marketplace, and in which literary communication was still vaunted as a powerful player in the making of scientific knowledge. When Dickens defended his use of spontaneous combustion as a plot device

in scientific terms, he defended his active role in the constitution and dissemination of scientific ideas. And he defended his role as a man of mid-Victorian science as fully significant as so many of those men who sought to exclude him from their ranks.

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